Appendix FF - Post-designation Community Interview Results

The information below was collected during a series of small group meetings and individual interviews conducted in early December 2000. Meetings and interviews were facilitated by social scientists from The University of Idaho (UI), College of Natural Resources. BLM representatives were not present and no formal public testimony was given. Instead, interviewees aresponded to open-ended questions posed by neutral facilitators regarding social and economic effects of CSNM designation on local communities.

The UI social scientists asked BLM to suggest a list of community members with a spectrum of positions on the monument that could provide a wide variety of perspectives on CSNM and its impacts on local communities. BLM provided the UI with contact information for several community members who expressed interest in participating.

Three small group (6-8 people) interviews, organized and hosted by different community leaders, and several individual interviews, were conducted over a 3-day period. Participants included local business owners, ranchers, retirees, landowners, individuals involved in restoration forestry, a county commissioner, a representative of an environmental group, and others. The intent of these meetings and interviews was not to contact everyone in the community. Rather, it was to identify the range of perspectives in the community related to two main questions:

- What have been the effects of CSNM on you and your community?
- How do you think CSNM will affect you and your community over the next 1 to 5 years?

The facilitators conducted the meetings and interviews so that the focus was clearly on CSNM's effects on individuals and the community since designation, and the likely effects over the short-term, not on future management decisions or desired conditions.

Effects Since CSNM Designation

Negative

Lack of consultation with CSNM residents before designation

Top down designation, lack of BLM contact with local residents, and ineffective means of communication has led to a lack of trust in BLM on the part of the public and a deterioration of relationship between BLM and the public.

- lack of BLM contact with local residents(within CSNM/ Greensprings)
- Deterioration of relationship w/ BLM and enviros (CSNM supporters)
- Top down designation led to lack of trust
- BLM did not contact all interested parties because of ineffective means (i.e. those off the grid)
- BLM ignores public input
- Poor dissemination of information by BLM

- CSNM management has begun before mgt plan is written. The CSNM currently exists without a management plan, but still effects public use of area (i.e. hunting access).

Feelings of uncertainty of future management

Lack and/or vagueness of CSNM management information has raised concerns about a variety of issues, helped the spread of misinformation and rumors, and has helped to galvanize opposition to CSNM.

- Road access on public land to pvt. property, hunting areas, recreation areas, etc
- Created/galvanized opposition to CSNM
- Vagueness of information and lack of management document besides declaration of CSNM
- Uncertainty about which local BLM official is ultimately responsible for CSNM
- Uncertainty about loss of local control
- Misinformation/ rumors re: impacts to pvt. property
- Concerns about the need for larger BLM staff to manage and protect CSNM and that funding will not be available, which may result in adverse impacts to local communities (more visitors may result in increased trespass on pvt. property, increased fire danger in campgrounds, etc.).

Division/polarization of the community

Designation has exacerbated divisions in an already division-prone community resulting in "more people unwilling to come to the table" and collaborate on shared concerns regarding the CSNM. Community is less friendly as people take pro and anti CSNM sides.

- People not speaking to people with opposing views on CSNM
- Exacerbated divisions in an already division-prone community
- More people "unwilling to come to the table" now to work collaboratively
- Some residents threatened to move away because of CSNM
- Loss of some clientele at pro-CSNM business
- Galvanized opposition to CSNM
- Community less friendly
- Some business owners support CSNM, some oppose

Access

Road access is a critical issue for local residents and users.

- Road maintenance has not kept up with increased visitation
- Uncertainty of road closures (access both to CSNM and private property)
- OHV users want access
- Hunting's infringed by closures
- No clear point of entry for visitors
- Disabled hunters disenfranchised
- Road closures will affect emergency access to private land/inholdings
- Good for hunters who don't want OHVs in hunting areas

Increased visitation

Many residents have observed increased numbers of visitors/vehicles in the area leading to new and increased impacts to the environment.

- More cars and trucks on Soda Mtn. Rd., Pilot Rock Rd., and other forest roads
- More hunters (which presumably reduces wildlife populations)
- Negative impacts to road surface conditions
- Increase in visitors to fire tower
- Vehicular trespass on private land has increased causing soil erosion and ruts

Safety

Concern for personal safety due to increased visitation, hunting, and newcomers in area.

- More hunters equals more guns near houses
- Hunting from road increased
- Concern for personal safety and property due to newcomers (crime/vandalism)

Private Property/Boundaries

Inclusion of private property within outer CSNM boundaries promotes trespassing and has created inholders of some whom would rather not be.

- Increased visitor trespass on private property
- Increased BLM trespass on private property
- Some BLM maps appear to include pvt property in CSNM
- No indication to public where private land is located
- Has created inholders

Changes in logging practices

There is anecdotal evidence that the CSNM has increased logging on private land having a variety of impacts.

- More logging and more irresponsible logging on private land
- Increased heavy log truck traffic on Hwy. 66
- Increased fire hazard from slash
- Negative effects on water quality
- Will make it harder to restore land later
- Heavy cutting on private land has forced some to take a stand for preservation and has led to polarization

Law enforcement

CSNM has changed law enforcement in the area leading to feeling of intimidation of some local residents and tension in the community.

- Local law enforcement supplemented by increased fed law presence and enforcement and more stringent laws creates fear and tension in community

Positive

Recognition of CSNM as worthy of preserving

Some local people are pleased that the place where they live is being recognized nationally as a special area, and that this will lead to special protection.

- Sense of pride
- Consideration of CSNM's maintenance carried to national level
- Relief that fire hazard will be addressed by BLM
- Relief that area will remain wild and protected
- More concrete assurance of future protection
- People feel their values are being protected / don't need to worry about being ignored anymore
- OHV issue resolved on paper (the law)
- Logging on CSNM land has stopped
- Increased protection of biodiversity / forest
- Increased protection for PCT
- Reduction in road building

Unifying like-minded community members

The designation has drawn together groups both in support of and opposed to the CSNM and given greater voice to each.

- Unified supporters to voice support for increased protection of area
- Pro and anti CSNM sides unified independently
- Good community discussions amongst parties who agree on CSNM, neighbors getting to know each other
- New pro CSNM group forming
- Increased local voice in decision making
- Motivating more people to get involved

Greater awareness of CSNM biodiversity

- Information brought to light by designation has increased awareness of biodiversity within the CSNM both for community and population at large.

Future Effects: Change in the Overall Character of the Community

People were asked for their perceptions on how the management of the CSNM over the next 1 to 5 years would affect their community. In order to facilitate discussion and stimulate thought on the subject, we asked participants to consider 4 specific aspects of community (economy, physical character, social make-up, and organization and leadership capacity).

Jobs and wealth: The Community's Economy

This dimension refers to the major businesses and sources of jobs in the community, and the diversity of the economy in terms of the variety of businesses, industries, and financial assets (the amount of capital or wealth) available to support the community's services and activities.

The major businesses and industries of the community, such as manufacturing, services, retail and wholesale trade, agriculture, forestry, and government are interrelated and provide a source of jobs and income. The relative mix of jobs and income in these industries is an indication of the community's economic diversity.

Positive

- Increase in job opportunities (private sector seasonal jobs, public sector jobs, jobs in thinning/ small diameter logging)
- Service/tourism related businesses will benefit
- Tax base should increase
- Property values should increase because of increased desirability of living in CSNM
- Increased opportunity for new businesses
- Easier to get more grants for tourism/restoration enterprises
- Possible to move towards a restoration economy
- Increased tax revenue for county from new businesses in area

Negative

- Property values may go down near critical habitat, or due to new building regs
- Taxes will increase
- Concerns about over-commercialization of CSNM
- Stricter grazing rules will force ranchers to manage differently, which could jeopardize economic viability of grazing due to increased regulation (new costs to ranchers) causing a loss of ranching jobs or businesses.
- Change from commodity based economy to a recreation and tourism-based economy. (Local economic opportunities will decrease)
- Loss of some recreation opportunities (esp. motorized vehicle restrictions) will have negative economic effect on some recreation-dependent businesses.
- Will cause mill closures
- Cumulative effect of other possible CSNMs in OR will hurt state economy
- CSNM will result in more BLM employees and waste more tax dollars
- Will reduce pvt property value where it's surrounded by CSNM
- O & C lands in CSNM will provide less revenue (no logging) to county
- County tax base could fall if feds buy pvt. land

Neutral or both

- More transfer payment/unearned income
- More tele-commuting
- Minimal economic effects overall
- Restrictions on use of property (moratorium on future building)
- No change in cost of living (most people buy everything in town)
- Won't have much negative effect locally because most people aren't earning money from resource extraction jobs
- Will not have big effect on timber harvest which is already in decline on public land
- Economic boost at county level, but at smaller scale, some individuals might not benefit

Physical Character of the Community

This dimension refers to the characteristics of the human-built and natural environment of the community. The community's physical infrastructure and built environment includes characteristics such as the attractiveness of the downtown, the quality of the community's roads, and traffic safety and congestion, as well as the level of social services provided. The community's natural environment includes characteristics such as parks, fields and rivers, as well as the attractiveness of the surrounding scenery.

Positive

- Will protect the scenery
- Knowledge by locals of good land use practices should increase
- Probable better management of cattle
- End of cut and run logging on public land
- BLM will shift from short-term to long-term emphasis/perspective assuring protection in perpetuity
- Will make someone in BLM accountable for stewardship of CSNM and thus accountable to local concerns for protection of CSNM
- Facilitates regional conservation efforts (CSNM compliments other protected areas in the region)
- More holistic management by BLM will encourage likeminded landowners to increase their own restoration management on private land
- Management plan will allay uncertainty and allow private individuals to undertake long-term planning (i.e. environmental restoration, estate planning).

Negative

- Increased/faster traffic
- Will increase absentee ownership/vacation homes
- Increase in crime (vandalism, trespassing)
- More ugly signage will come
- Greater risk of accidental fire caused by visitors
- In-migration of "urban types" increase risk of fire due to ignorance of fire risks (also noxious weeds)
- End to multiple use management in favor of conservation will reduce biodiversity, increase noxious weeds, and contribute to fuel loading
- Reduce working landscapes and economic engine
- Road closures will reduce recreation opportunities
- Gates will hamper personal visits to local residents' property
- End to multiple-use mgt of BLM owned Box O Ranch
- Could lead to increased development on pvt. land (esp. already logged land)
- Will be difficult for BLM to manage checkerboard of land ownership
- Displacement of multiple use management from the CSNM area to other public lands (i.e. Making up for timber not cut in CSNM)
- New endangered species will be found, which will reduce pvt property freedom
- Concerns about water rights and increased water quality monitoring on pvt property
- Will result in de facto BLM control/regulation of pvt property
- Limiting thinning in CSNM may increase fire hazard and jeopardize pvt. property
- Closing roads will decrease ability of locals to get to and fight fires
- Increased use of prescribed burns by BLM will increase possibility that fires will get out of control and damage private property
- Locals will have to install signs and fences to stop trespassing because visitors will not know boundaries of inholdings
- Will precipitate increased public scrutiny of public and pvt. land management by outsiders

Neutral or both

- Decrease in number of ranches
- Increase or decrease development
- Improvement of water quality and air quality (or not)
- Bikes will be banned from closed roads (or not)
- Grazing will be phased out (no new grazing permits will be issued)
- Taking farmland in land swaps is more likely
- No BLM commercial logging in CSNM
- More control of ORV use
- BLM now will consider purchase/exchange of pvt. land
- BLM will be forced to change from commodity to protection orientation

People: The Community's Social Make-up

This dimension refers to characteristics of individuals or households in the community. Characteristics relating to the individual or household might include the community's population size, how rapidly it is growing or losing population, its age and family structure, as well as the make-up of various groups of people, including their ethnicity, their values and lifestyles, and other kinds of diversity.

Positive

- Reduced need for public assistance (community composition will be more affluent)
- Increased sense of place attachment because CSNM status is one more amenity
- Newcomers bring new opinions about how to do things

Negative

- Decrease in extended families living in area
- School enrollment will decrease as population gets older
- CSNM will change character of community and economy
- More non-southern Oregon values due to in-migration may conflict with values of long-time residents
- Decreased multi-generational ownership of land
- People who use their land to earn a living will be most heavily impacted by CSNM because of increased regulation (CSNM forcing land-using people to change their way of life)
- Some younger people will move away because "freedom" has been taken away

Neutral or both

- Older population (more retirees)
- Increase in ethnic diversity, or not
- Community will become more urbanized (in terms of attitude) -- people more isolated with ex-urbanite social patterns; less friendly also, or not
- Population will increase, or not
- CSNM will draw more environmentally-minded residents to area (this will lead to reduced friction but also reduced diversity of perspectives)
- CSNM not expected to greatly increase visitation in area
- Some ranchers want to be bought out

Vision and Vitality: The Community's Organization and Leadership Capacity

This dimension refers to the characteristics of the community's social organizations, including the number of civic groups and their level of activity. This dimension also refers to the community's cohesiveness -- the extent to which people identify with the

community, are committed to it, and work together to get things done. In addition, this dimension refers to the effectiveness and vitality of the community's government and its ability to accomplish its goals. Finally, this dimension refers to the community's vision for the future and the desire and preparedness to make that future a reality.

Positive

- Membership and activity of civic organizations concerned with CSNM management will increase
- Quality of political and civic leadership will increase as CSNM management issues spur more people to get involved
- County tax revenues will increase
- CSNM could eventually bond the community together (In long-term fears and divisiveness will dissipate)
- Could unify locals to defend pvt. property from BLM eminent domain "takings"
- Opportunity to bring people together around love for the land
- Increased continuity in communication between BLM and public regarding resource management
- Increased possibility of collaboration between BLM and private landowners

Negative

- More zoning laws will restrict pvt property use
- Loss of a chance for BLM to deal with landscape holistically considering both pvt. and public lands
- Loss of options for doing collaborative (public/pvt.) projects
- Loss of local control over land use decisions

Appendix GG - CSNM Weed Management Strategy

INTRODUCTION

Weed invasion poses a serious threat to many plant communities of the CSNM. Several weeds (noxious and others) commonly found throughout the CSNM are often associated with areas of disturbance.

Annual grasses such as medusahead (*Taeniatherum asperum*) and cheatgrass (*Bromus tectorum)* are ubiquitous throughout open plant communities of the CSNM. Yellow starthistle is frequently associated with medusahead, particularly on the Agate Flat. Isolated patches of medusahead can also be found within otherwise native dominated herbaceous understories of the Jenny Creek uplands and other open areas of the CSNM. Dyers woad (*Isatis tinctoria*) is a threatening newcomer to the monument's grasslands, shrublands and woodlands. Recent surveys have shown that bulbous bluegrass (*Poa bulbosa*) has expanded its range and foliar cover within open hardwoodlands and conifer communities considerably over the last 30 years. Canada thistle is a serious problem in acutely disturbed areas along roads, stock ponds, and tree harvest areas.

This document presents a summary management strategy and a literature review of important life-cycle characteristics and control measures for the most prevalent weeds of the CSNM. Desired native perennial herbaceous plants are frequently interspersed with weeds, the objects of control. Since control methods may affect adjacent non-weed plants, a short literature review is provided to describe the effects of commonly used weed control measures on desired native grasses, forbs, and shrubs.

Guiding Principles for Weed Management

- Emphasize on maintenance of healthy native vegetation;
- Prioritize treatment of small weed patches over large areas of weed domination;
- Two to three years of weed control may be necessary before native plants become competitive against weeds;
- Focus weed control on plants and seedbanks;
- Reintroduce Native plants where they are lacking;
- In drier areas (Klamath River Ridges) manage native vegetation to exploit soil moisture so as to prevent weed growth and proliferation
- Maintain a range of weed treatment options to suit local conditions (e.g. within and outside of riparian areas) and varied requirements over time (e.g. fire can only be implemented during the first year of a multi-year treatment series)
- Implement pilot studies

Most apparent is the need to integrate weed control / management into all aspects of land management, including vegetation manipulation, prescribed fire, livestock management, recreational activities, and the transportation system. The literature supports the formulation of a general management strategy incorporating aspects of vegetation management and weed control in (roughly) the following order of priority :

A General Vegetation Management Strategy Incorporating Weed Control

1. Maintain healthy herbaceous plant communities as a barrier to weed invasion.

2. Limit ground-disturbing activities.

3. Maintain source of native herbaceous seed for emergency restoration; sow with native herbaceous seed (from local seed source) where natural or ground-disturbing management activities do take place.

4. Improve condition of stands with mixture of weeds and remnant native herbaceous species (mowing, fire, herbicides, cultural, hand-pulling, grazing, bio-control, no-action).

5. Restore isolated weed patches to native herbaceous plant domination
   - hand-pull (only works for small populations)
   - spot herbicide application on target plants (away from water, other important biological features)
   - seed with native grass

6. Isolate extensive weed areas (>1 acre) to prevent spreading
   - ensure no motorized vehicle, cycling, hiking, livestock thoroughfare, particularly during the wet season when mud acts as an adhesive.

7. Create a long-term restoration / management plan for extensive weedy areas (>1 acre)
   - apply treatment method(s) most suited to species and location on landscape
   - monitor efficacy of treatment(s)
   - alter management strategy as needed
   - several years of treatment application are necessary for control of seedbank

8. Survey wet meadows, seeps, and springs to quantify restoration needs. Initiate restoration of hydrological functioning where necessary.

9. Design long-term management plan for maintaining a range of conditions / habitats within plant communities of the Monument.

Some of the major ecological problems associated with grass / shrub / woodlands involve annual grasses and yellow starthistle. Table AGG-1 summarizes control options for these species, which are described in greater detail in the literature review. See the literature review for more detail. However, the treatments described in this text are a disturbance in themselves, and can result in some undesired consequences. These area summarized in Table AGG-2. Any application of these control measures would comply with the Integrated Weed Management Plan / EIS (Appendix S) also supplied as an appendix within this DEIS.

Table AGG-1. Summary of Management Technique effectiveness for cheatgrass, medusahead, and yellow starthistle:			
	Consequences to Target Species		
Technique	**cheatgrass**	**medusahead**	**starthistle**
No-action	Plant communities with a healthy herbaceous component are able to compete against weeds and offer the best prevention of weed invasion. Depending on initial conditions, plant communities may show an increased native grass abundance following livestock removal. Other areas may show sudden increase in weed abundance following removal of grazing constraint.		
Manual Weeding	Effective on small scale for new plantings only		Very effective for small populations
Cultural (disking, ploughing)	Can be an effective treatment, control of timing of treatment application is essential; needs to be combined with native seed application; will require alternative treatments in subsequent years		
Mowing	Can be effective treatment, control of timing of treatment application is essential, can contribute to the maintenance of native herbaceous understory, needs to be combined with other control methods, difficult to apply on rough terrain		
Grazing	In some situations, cattle grazing can be effective treatment, however, control of timing and intensity of treatment application are essential. Can contribute to the maintenance of native herbaceous understory, but needs to be combined with other control methods		Cattle grazing during the rosette stage favors starthistle. Partial control can be achieved during the bolting stage. Control on timing and intensity are critical; goat browsing very effective
Herbicide	Individual plant species or growth-form specific herbicides are available; apply early summer before flowers/inflorescences mature, but after summer drought prevents regrowth; second application may be necessary		
Bio-control	None available		Effective in certain locations only; bio-control release program already underway
Fire	Can be effective treatment, control of timing and intensity of treatment application is essential; also critical for maintenance of healthy native herbaceous understory, particularly at lower elevation		
Native plant seed application	rarely effective on its own; best after at least two years of weed plant and seedbank control		

Table AGG-2. An assessment of the advantages and disadvantages of control methods used for reducing weed seed production and establishment within the CSNM

Treatment	Advantages	Disadvantages
No-action	-depending on initial conditions, no-action may favor competitive native vegetation the best preventative of weed invasion.	- evidence from relict data suggests that weed invasion also occurs under no-action
Manual weeding - whole target plant removal	- remove target species only	- effective over small areas only - severe damage to micro-topography and microphytic crust by trampling - could lead to soil surface instability
Cultural treatments -entire plant removal	- precise control of timing	- acute disturbance may destroy remnant native vegetation - may promote weed invasion - difficult to apply in wildlands, especially rough or rocky terrain
Mowing - removal of above-ground parts of all plants	- harmless to bunchgrasses	- light to moderate damage to soil surface depending on technique used - may lead to soil surface instability - may need 2 or more applications
Grazing - timing and intensity may allow targeting of specific plants/weeds	- reduces litter - can rejuvenate bunchgrasses - treat large areas - timing and intensity may allow targeting of specific plants/weeds	- Insufficient livestock control may result in degradation of adjacent biological resources (wetlands, springs, riparian areas) - livestock are a vector for spread of weeds
Herbicide application -whole plant death	- target specific areas - target specific plants - 1 treatment per year - most cost effective - low soil surface disturbance	- may harm other life-forms if timing and targeting of application not correct
Bio-control	- target-plant specific	- could harm plants closely related to target plants
Prescribed Fire - removal of above-ground parts of all plants	- reduces litter - rejuvenate bunchgrasses - treat large areas	- potential damage to property if fire escapes - much planning required - kills woody plant species - kills lichens - intense summer burns may lead to soil instability
Native plant reintroduction	- may be no alternative to re-establishing native species	- none, if guidelines for maintaining genetic integrity of local natives plants are followed

Many of the observations on weed management in this review are derived from research conducted in the Great Basin. Pilot studies are necessary to ensure that treatment methods suite local conditions. Other weeds not included within this literature review have different life-cycles and may favor specific control measures. For example, since Canada Thistle can propagate vegetatively, hand-pulling and cultural techniques may aide propagation of new plants. Systemic herbicide treatments appear the most effective control measure. Further literature review for Canada thistle, dyers woad, and other weed species will be completed as necessary.

Literature Review of Annual Grass Life-History and Control Measures

A brief review of the life histories of cheatgrass and medusahead provides a better understanding of the annual grass control methods described in this document.

Life histories and control of cheatgrass and medusahead

Cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum asperum*) share many life-history characteristics. Both are introduced annual grasses that have substantially impacted ecosystem functioning in a way that ensures their persistence. An important life-history trait that enables persistence is their ability to germinate in the fall. A tolerance for cool soil temperatures allows root development and resource capture earlier in the spring than other plant species. Early maturation and senescence provide fine fuel allowing more frequent, and destructive early fires (Whisenant 1989).

Table AGG-3 enumerates some of the life-history stages of cheatgrass. Cheatgrass shows a high number of individual plant species per unit area. Though no data from a single site corresponds with all of the attribute headings of Table AGG-3 exists for medusahead the literature suggests a similar pattern of reproduction. Medusahead has been reported to have a slightly higher seed production per unit area than cheatgrass. The greater seed production and inhibition of cheatgrass germination by mat formation are thought to be two reasons allowing medusahead to invade cheatgrass infested areas.

Cheatgrass recruitment is concentrated in the late summer / fall, but may continue through to early summer the following year (Mack and Pyke 1983). This results in an excess of 20 cohorts, their fate dependent on season of emergence and the vagaries of precipitation (Mack and Pyke 1984). Late summer and early fall cohorts are often killed by drought in September or October (Mack and Pyke 1984). Frost heaving and grazing by voles accounted for many winter deaths. Fungal infestation of the seedhead (smut - *Ustilago bullata*) predominated amongst spring cohorts resulting in up to 30% mortalities (Mack and Pyke 1984). Low seed production by fall cohorts may be offset through increased seed production by later cohorts (Mack and Pyke 1983). This implies that control measures should be applied in the spring after most cohorts with a high probability of seedset success have germinated, but before their inflorescences have had a chance to mature. Control measures for cheatgrass need to be applied before the red stage, since such plants are able to mature on the ground (Hulbert 1955). Since only 45 days are required for seed production (Mack and Pyke 1983), single applications of control methods may not be successful in years with extended spring / early summer precipitation.

Table AGG-3. Life history attributes (attribute/m^2) of cheatgrass, derived from Larson and Sheeley (1994).

Attribute	Cheatgrass
Mature plants	660
Seed production	7000
Seed rain	7000
Seed bank	300
Fall seedlings	6200
Spring seedlings	2000
Mature Plants	543

An important factor of cheatgrass and medusahead seedbank dynamics is the high seasonal fluctuation in germination rates (Murphy and Turner 1959). Fewer than 13% of caryopses produced in the summer may remain in the seedbank until the following winter (Mack and Pyke 1983). This carryover varies, and is no doubt dependent on precipitation and site specific characteristics. Though cheatgrass may remain viable in laboratory conditions for up to 12 years, seeds show less persistence under field conditions (Hulbert 1955, Hull 1973). Medusahead seedbank shows similar fluctuation, with up to 90% germination of the annual seed production (Sharp et al. 1957). Hironaka et al. (1963, in Turner 1969) found that though medusahead seeds can remain viable in the soil for up to three years, that germination was reduced to 3 percent.

Of significance to management is the limited spatial dispersal by the majority of cheatgrass seeds. Most cheatgrass seed disperse less than 1 meter from the mother plant (Hulbert 1955). This is supported by observations that infestations are often spotty (Furbush 1953, Tausch et al. 1994). Such limited dispersal implies that the seedbanks are spatially discrete, and that immediate treatment needs only to be focused in the direct vicinity of mother plants.

Cheatgrass and medusahead show different patterns of seed maturation, release and dormancy. Cheatgrass generally matures two weeks prior to medusahead. In addition, seeds are able to disseminate as soon as they mature, and generally require only a short after-ripening period before being germination ready (Thill et al. 1984). Medusahead seed may be retained within the seedhead for up to one month following maturation (Mckell et al. 1962b), and also requires an after-ripening period before germination (Murphy and Turner 1959, Young et al. 1968). The germination, dormancy, and dispersal characteristics discussed above make both cheatgrass and medusahead susceptible to management strategies aimed at preventing seed production and maturation (Pyke 1994). However, medusahead has been found to be phenotypically plastic to the extent that a single plant can produce more than a 1000 seeds (Young 1992), indicating the importance of continued monitoring.

Of equal importance to the actual technique of annual grass reduction, is the strategy within which the technique is used.

Management strategies suggested for use against cheatgrass and medusahead

A review of the literature reveals that effective management needs to consider several factors. First, the reduction of the seedbank (Goebel et al. 1969, Young et al 1999), and second, the establishment of an alternative (desired) species to prevent the re-establishment of annual grass domination (Higgens and Torell 1960, Major et al. 1960, Goebel et al. 1969, Baker 1972, Christenson et al. 1974, Hilken and Miller 1980, Antognini et al. 1995). Since high cover by litter has been shown to inhibit seed germination of other species (Goebel et al. 1969), litter removal may be necessary if revegetation by seeding is proposed (Torell et al. 1961, Goebel et al. 1969).

The literature also indicates that management depends on the extent and pattern of infestation by annual grasses (Major et al. 1960) and precipitation regime (Monsen 1994, Sanders 1994). Since healthy stands of perennial bunchgrasses appear to be the most effective deterrent to invasion (Dahl and Tisdale 1975, Horton 1991), emphasis needs to be placed on the maintenance of existing stands. This includes ungrazed and relict areas, since these are also susceptible to cheatgrass invasion (Lovejoy 1980, Passey et al. 1982, Anderson and Inouye 1988, Svejcar and Tausch 1991, Tausch et al. 1994, Hosten 1995b). Initial invasions often appear spotty (Furbush 1953, Tausch et al. 1994). Efficient management should aim at removing such infestations (Furbush 1953, Turner et al. 1963), since costs rise with the seriousness and size of the infestation (Furbush 1953).

Sanders (1994) lists three options for managing areas already converted to annual grasslands. First, to manage the area as an annual grassland. Second, to convert to a perennial grassland through manipulation of grazing. This is only possible if remnant bunchgrasses remain, and the rainfall is greater than 356 mm per annum. Third, to convert back to an annual grassland by reseeding. Sanders (1994) advises that in areas having less than 305mm precipitation that only crested wheatgrass (Hycrest) should be used. Monsen (1994) notes that seeding within cheatgrass infected areas is hazardous with an annual precipitation of less than 254mm. Success may depend on the spring precipitation following the seeding event (Sanders 1994).

Past successful revegetation techniques frequently involve more than a single control method depending on climate, topography and phenology of the plants involved (Young 1992). Ogg (1994) indicates a need for the integration of control methods (cultural, mechanical, biological and chemical) for sustainable weed control, and to recognize biological, economical and environmental factors. While several papers cite references using cultural treatments (Hilken and Miller 1980, Lancaster et al. 1987), these are not considered suitable for the CSNM because of their excessive disturbance and high probability of colonization by the widespread annual grasses.

Fire as a management tool

While the utility of fire as a weed control mechanism is well established, its misuse can result in considerable harm. Fire has generally been associated with cheatgrass invasion at larger scales (Stewart and Hull 1949, Whisenant 1989) due to mortality of individual bunchgrasses. In spite of these results, fire has been suggested as a suitable tool for combating cheatgrass (Rasmussen 1994) and medusahead (Murphy and Lusk 1961, McKell et al. 1962b, Goebel et al. 1969, Hilken and Miller 1980). Fire trials aimed specifically at controlling medusahead are ambiguous, showing both increases and reductions in abundance (Turner et al. 1963), perhaps indicating site specificity. Reductions in annual grasses may also be temporary (Rasmussen 1994), depending on whether remnant bunchgrasses remain (Hosten and West 1994).

The literature indicates that timing of fire application is critical for annual grass reduction. For treatment of both cheatgrass and medusahead, fire is advocated prior to seedfall when seeds are still in the dough stage (Murphy and Lusk 1961, Mckell et al. 1962a). Several papers reporting research on Californian annual grasslands advocate burning while associated species are in the seed shatter stage (Furbush 1953, McKell et al. 1962a, McKell et al 1962b, Murphy and Lusk 1961). This results in medusahead reduction, and dominance by those species whose seeds have already fallen to the ground. While these authors discuss the topic of reducing medusahead, they do so in an environment already converted to annuals and devoid of native perennial grasses. In ecosystems where bunchgrasses are present and susceptible to fire, this is not a recommended procedure. In general, dormant season burns favor remnant perennial bunchgrasses (Young 1992). Wright and Klemmedson (1965) consider summer burns undesirable. Burning after medusahead seed has disseminated promotes dominance by this species. An alternative prescription is spring burning (Rasmussen 1994). This may only be possible if sufficient litter remains from previous years, and if the litter has dried out sufficiently to act as fuel. This situation may only occur on south facing slopes in years of limited spring precipitation. Since the soil moisture remains high following an early spring burn, the remaining annual grass seed pool may germinate, necessitating a follow-up treatment. With follow up treatment (herbicide, manual removal, mowing, grazing), a substantial proportion of the seedbank could be removed. Medusahead tends to retain its seeds within the inflorescences longer than cheatgrass. This may provide an opportunity to burn the less favored medusahead grass seed while favoring cheatgrass.

The fact that cheatgrass germination is repressed below sagebrush canopy following fire (Blank et al 1994) may be an indication that high temperatures may kill seeds. The effectiveness of fire for the removal of seed may thus be dependent on the amount of fuel available, and consequent nature of the fire. Where sufficient fuel is available, slow fires with high ambient temperatures are suggested for maximum effective killing of seeds (Harwood 1960, Murphy and Turner 1959, Murphy and Lusk 1961, Mckell et al 1962b). Seedbanks of both cheatgrass and medusahead are thought to be considerably reduced with a single fire event, since a major portion of the seedbank germinates every year. In addition, neither cheatgrass nor medusahead seed appears long-lived within the soil. However, a small proportion of the initial seed pool may still represent a considerable number of seeds and consequent crop of plants during the ensuing growing season. Furthermore, the high seed production of these plants may result in a rapid recruitment of the seed bank and annual crop of individual plants, unless precautions are taken.

Plant defoliation as a management tool

Annual grass defoliation (clipping, mowing, livestock and small mammal grazing) have been shown to decrease seed set in annual grasses (Pyke 1986, Tausch et al. 1994, Turner 1969). Single, or even repeat defoliations, do not appear to completely suppress annual grasses. As suggested in the introduction, the establishment of an alternative, perennial vegetation, is a necessity for long-term rehabilitation.

Turner (1969) found that early and late mowing and grazing schedules improved vigor of California oatgrass (*Danthonia californica*) in the foothill ranges of western Oregon by reducing competition with medusahead. Early grazing and mowing schedules remained ineffective. This implies that at least two defoliation events are required for annual grass seedset control.

Tausch et al. (1994) examined the effect of fall and early spring, early-spring-only, and late-spring clipping only on cheatgrass and perennial bunchgrass phytomass in western Nevada. Late-spring clipping yielded the largest decrease in cheatgrass phytomass. Fall-clipping increased cheatgrass production, while phytomass was not different for the fall-plus-spring treatment and controls. All treatments reduced bunchgrass phytomass. Fall-

clipping appeared to reduce bunchgrass ability to compete with cheatgrass in the following year. Late-spring-clipping (while cheatgrass was in the boot stage), had the least negative effect on perennial bunchgrass phytomass. Since the latter treatment was the most harmful to cheatgrass, and the least harmful to bunchgrasses, it appears to be the best choice of clipping regime within cheatgrass impacted areas, regardless of perennial bunchgrass presence.

A disadvantage of grazing is the confounding effect of trampling, though this can also be used as a seedbed treatment for perennial grass seeding (Winkel and Roundy 1991, Winkel et al. 1991). Unequal distribution of livestock may also result in localized degradation at watering points and under shade trees. Vallentine and Stevens (1994) imply that lack of absolute control of livestock is probably the major reason for not using grazing as a cheatgrass control technique. Caution needs to be used with mowing, since inflorescences can mature on the ground once they have started to turn red (Hulbert 1955).

The high silica content of medusahead makes grazing an ineffective tool for medudahead management, unless applied early in the spring.

Herbicide application as a management tool

The effectiveness of herbicide treatment of medusahead increases with removal of litter (Higgins and Torell 1960, Torell and Erickson 1967). Burning is thought to allow remaining seed to come into contact with mineral soil, resulting in germination and more effective subsequent control (Torell et al. 1961). Herbicide application at the boot stage has been shown to be effective for cheatgrass (Whitson 1994 a,b) and medusahead (Goebel et al. 1969, Kay 1963, Morton et al 1958).

The literature identified two major scenarios within which chemical treatment may be applied for the control of annual grasses. These are areas completely dominated by annual grasses versus areas with remnant bunchgrasses. The first situation calls for herbicide treatment followed by a year of chemical of mechanical fallow (Lancaster et al. 1987, Young 1992). For the latter situation, several herbicides have been reported to be effective in controlling annual grasses while leaving perennial bunchgrasses unharmed (Hosten 1996). Hilken and Miller (1980) tabulate numerous herbicides and their relative success, while Ogg (1994) lists an updated list of registered herbicides for cheatgrass.

Climate may play an important role in the utility of herbicides. For example, paraquat (effective in California) was shown to be ineffective in the temperate desert climate of the Great Basin (Young 1992). Bunting (1994) and Ogg (1994) strongly recommend further research using glyphosate on rangelands. Whitson et al. (1994a) found that more than one application of glyphosate was necessary for 100% annual grass control, while a single application resulted in 90% control. The use of Quizalfop is relatively recent, and may deserve experimentation in the rangeland environment. Quizalfop has proven particularly effective against cheatgrass when dissolved in oil and applied using air assisted application techniques (Ogg 1994). As with other control methods, multiple year applications of herbicide are necessary for seedbank control (Whitson et al. 1994a). Fertilizing with potassium nitrate ($KNO_{3)}$ can enhance medusahead seedling emergence to improve the efficiency of seedbank harvest (Young et al 1999).

Table AGG-4. Herbicides used to control cheatgrass or medusahead in the presence of perennial bunchgrasses.

Herbicide	Target Species	Application Rate	References
Atrazine	annual grass in established perennial grass; annual grass during perennial grass establishment	0.56 - 0.84 kg/ha 0.6 kg/ha	Turner 1969,Currie et al. 1987, Young 1992, Lawrence et al. 1995
Dalapon		1.1 - 2.2 kg/ha	Young 1992
Glyphosate	cheatgrass associated with native perennial bunchgrasses of Wyoming	0.2 - 0.3 kg/ha	Whitson et al. (1994a,b)
Glyphosate + 2,4D	cheatgrass associated with crested, western, intermediate and thick spike wheatgrasses	0.4 - 0.7 kg/ha	Bunting 1994
Paraquat	revegetation of annual grass dominated rangelands	0.56 kg/ha	Young 1992
Pronamide	annual bromes in perennial grass stands	0.6-0.8 kg/ha	Currie et al. 1987
Propham	annual bromes in perennial grass stands	3.4 kg/ha	Currie et al. 1987
Quizalofop + COC	cheatgrass associated with new seedings of Covar sheep fescue	0.11 kg/ha	Bunting 1994, Ogg 1994
Quizalofop + bromoxynil + COC	cheatgrass associated with new seedings of Covar sheep fescue	0.11 + 0.28 kg/ha	Bunting 1994, Ogg 1994

Literature Review for Yellow Starthistle Control

Several excellent resources on the subject of yellow starthistle control exist on the internet (http://soils.ag.uidaho.edu/yst/Control/control.htm; http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7402.htm; http://www.efn.org/~ipmpa/Noxystar.html; http://www.tasteldorado.com/transline.htm). The following text is summarized from these resources and other papers derived from scientific journals.

Many of the conceptual underpinnings of weed management discussed for annual grasses apply also to yellow starthistle. However, there are a few fundamental differences in the ecology of yellow starthistle versus annual grasses that may alter the timing of control measures.

Similar to annual grasses, yellow starthistle has a phenomenal rate of seed production per unit area from 5200 to 21600 seeds m^{-2} (Sheley and Larsen 1994b). Yellow starthistle differs from the annual grasses in terms of its phenology and root development. While the plant can function as a winter annual, it tends to persist in a rosette form through the colder months of the year and puts on a growth spurt later in the spring/early summer. Its longer root system allows it to extract moisture from deeper down in the soil profile in comparison to cheatgrass and medusahead. The plant is competitive against native bunchgrasses, as can be seen from its invasion within the Scotch Creek RNA. On most of

the Agate Flat area and the former Box-O Ranch, starthistle invasion is occurring in altered plant communities. At risk are bottomland pastures that are going through plant community changes consequent to the cessation of irrigation. The loss of perennial plant place-holders due to summer drought allows yellow starthistle to gain a foothold. This is probably due to its ability to utilize deeper lying water resources. Annual grass dominated areas on the lower south-facing slopes of the CSNM are readily invaded by yellow starthistle. Surveys indicate a high abundance of yellow starthistle along roads. Interference studies indicate that rangelands with both cheatgrass and yellow starthistle show greater resource partitioning, potentially increasing the difficulty of restoration towards perennial grass cover (Sheley and Larsen 1994a).

Yellow starthistle seedheads contain two kinds of seeds. Bristled seeds are rapidly dispersed while seeds without bristles tend to persist within the seed head eventually dropping to the ground (Oregon Dept. Agric. 1997). Most seeds appear to fall close to the parent plant (Roche 1991), though studies do not cover phenomenological events such as whirlwinds, windstorms, or overland waterflow. Dispersal vectors likely include livestock, wildlife (birds and mammals), wind, hikers, and motor vehicles. The ability for seeds to remain dormant for up to 10 years means that seeds can still germinate several years after herbicide or other treatments (Oregon Dept. Agric. 1997). As a result of the prevention of seed-rain, seed and seedling density were reduced to 3.9 and 1.1 percent of their former values after 36 months. Restoration practitioners find that smaller patches
of yellow starthistle can be eliminated within a few years by hand-pulling.

Seed production is impacted by dry spring conditions (Sheley and Larsen1994b) suggesting that type ans timing of control measures may need to vary with precipitation pattern and abundance. Yellow starthistle is a facile weed able to respond to late season flowering and seedset if moisture is available (Roche et al 1997).

Comparative life-history studies suggest that cheatgrass and yellow starthistle occupy different rooting depths, resulting in a partitioning of resources (water and nutrients) (Sheley and Larsen1994b). This is likely to create an even less hospitable environment for native plants (in comparison to the presence of only a single weed) and further complicate restoration. Total eradication of yellow starthistle may not be possible (Oregon Dept. Agric. 1997). As with annual grasses, the best protection against yellow starthistle treatment is probably to retain a healthy herbaceous plant community (Oregon Dept. Agric. 1997).

Several yellow starthistle control techniques have been examined within plant communities similar to those found within the CSNM. In general, most treatments are aimed at preventing established weeds from setting seed. Treatment application is timed late enough in the season to prevent successful regrowth, flowering and seedset by weed plants. Limited soil moisture or timing relative growing season can thus be used to reduce seed production. Repetition of treatments are aimed at depleting the soil seedbank. Site specific prescriptions should include seed application by native species able to fill in the niche vacated by the weeds so as to prevent re-invasion.

Cultural control methods involve acute soil disturbance. Ploughing, disking, or harrowing can be used to disrupt the growth cycle, bury weed plants, or facilitate the germination of the seedbank for future control. Deep ploughing can also bury seeds to depth where they cannot effectively germinate and reach the soil surface for plant establishment. Such methods create an unstable soil surface susceptible to erosion. This method is also excessively destructive to existing native plants. Seed application with a desired native species is essential for the success of this technique. The destructive nature of these treatments relegates it to small-scale application to areas of weed mono-cultures.

Mowing has been used to reduce seed set by yellow starthistle. This treatment is generally not considered as effective for the eradication of weeds. Plants re-sprout and may flower within a few weeks of mowing if sufficient soil moisture is available. Repeat treatments are usually necessary to treat regrowth. Second-growth flowers are located close to the ground thus reducing the effectiveness of repeat mowing. Thomsen et al (1997) found that mowing combined with sub-clover seeding effectively reduced yellow starthistle. Timing was critical, since early mowing allowed plants to re-sprout, while late mowing aided in the dissemination of seeds.

Competition provided by existing native vegetation is thought to be effective in reducing invasion by yellow starthistle. Clipping experiments using sod and non-sod forming grass cultivars in eastern Washington suggest that any foliage removal increase the invasion of a perennial grassland (Roche et al 1994). Sod forming grasses (intermediate wheatgrass and pubescent wheatgrass) were invaded less than bunchgrasses (crested wheatgrass and bluebunch wheatgrass). All four grasses resisted starthistle invasion if left un-clipped. Patterns of starthistle invasion were thought to be related to the amount of light available for sustaining winter starthistle rosettes and soil moisture available during the summer at the time of maximum growth Roche et al 1994). Rest from grazing may thus be an effective treatment for reducing yellow starthistle invasion.

Hand-pulling/hand-tools have been shown to be very effective for eradicating yellow starthistle. Hand weeding is best applied by combining the strategies of containment and reduction. Careful planning of weeding allows impacted areas to be invaded by desired native plants (Woo 1999). The greatest limitation of this technique is the limited area able to be treated.

Herbicide weed control has been shown to be very effective for eradicating weeds. The biggest concern with this method is the potential for chemicals to enter the hydrological cycle and damage other organisms proximal to target species. Careful definition of the treatment area, use of target specific herbicide and target specific herbicide application (spot spraying or wand application) can limit these undesirable effects. Cox (1998) suggests it is difficult to manage yellow starthistle with herbicide, while other authors retain herbicide used in conjunction with other tools, including the application of desired replacement plants. Woo (1999) favors the use of all tools except herbicide. Studies in Washington suggest that yellow starthistle is acquiring resistance to herbicide (Fuerst et. al 1996).

Fire has been shown to be very effective at reducing yellow starthistle abundance. As with all treatments, repeat application is necessary for controlling existing weeds and their associated seedbank. DiTomaso et al (1999) burned two study sites within Sugarloaf Ridge State Park for three consecutive years to achieve a 91% summer reduction in cover. Patchy burning may leave sufficient seed source to maintain seed production. Several years of litter accumulation are necessary to create a fuel load sufficient to generate enough heat on combustion to incinerate the plants and their seeds, particularly in drier climates. In most of our grass/shrub/woodland communities, effective use of fire requires integration with other treatment methods. Fire does have the advantage of facilitating the germination of the seedbank, allowing for more efficient weed control across several years.

Controlled grazing on annual grassland has been found useful for reducing yellow starthistle seedset (Thomsen et al 1992). As with other treatments timing must be carefully controlled to maximize its effect on weed plants but maintain desired native plants. Spring grazing may facilitate yellow starthistle. Cattle grazing is most useful as a short duration and high intensity treatment during the bolting stage of yellow starthistle growth and before spines develop (Thomsen et al 1994). At this phenological stage, earlier maturing species will have set seed, and thus have a competitive advantage over yellow starthistle. Goats may seek out yellow starthistle plants in preference to native

herbaceous species during some stages of growth. Eradication using this technique is unlikely. Local examples of using goats exist. Integration with other management tools appears to improve starthistle control. A combination of grazing, mowing, and sowing of subclover was considered successful (Thomsen 1996). Grazing and herbicide resulted in large reductions of yellow starthistle (Thomsen et al 1989).

Several **bio-control** vectors have been released within the Pacific Northwest and within the CSNM. While some localized success have been reported, more time is needed for an adequate assessment of bio-control efficacy (Thomsen et al. 1994, Larsen et al.1994). Bio-control vectors include three weevils and two fly species released in the Pacific Northwest (Larsen 1994, Oregon Dept. Agric. 1997).

Native plant response to weed control methods

While areas of complete dominance by weeds exist within the CSNM area, the interspersion of weeds and native plants is a more common, particularly at higher elevations. Also, since maintaining, enhancing and restoring native plant communities are management objectives for the CSNM, it becomes important to understand the interactions between native plants and weeds. Contrasting reactions of native plants to weed control measures may help design weed management strategies that place native plants at a competitive advantage over weeds.

The effect of fire on native plant species

Fire is often thought to have a devastating effects on native vegetation. In reality, most plant communities are adapted to fire, and may be classed as fire dependent. For example, grasslands and woodlands may show historical fire return intervals of 2 to 15 years. Ceanothus shrublands have been postulated to burn at intervals of around 25 years, though their association with oak trees point towards shorter fire return intervals.

General characteristics that mark local plants as fire adapted include: ability to re-sprout, requirement for heat stratification, increased germination following smoke treatment, and improved vigor and seed production following fire. In addition, several species of trees and grasses germinate and establish more readily following improved seed-mineral earth contact as a consequence of the combustion of the litter layer.

The most visible short-term effect of fire is the removal of species sensitive to fire and dependent on seed for re-establishment (Wright et al. 1979, Blaisdell et al. 1982, Humphrey 1984). These fire intolerant species include various sagebrush species, bitterbrush (Blaisdell 1953, Blaisdell and Mueggler 1956), and juniper (Burkhardt and Tisdale 1976, Dealy et al. 1978, Miller and Wigand 1994). Species that show physiological intolerance to fire re-invade sites through existing seedbanks or seed dispersal from unburnt areas. Some shrubs (*Chrysothamnus spp, Ceanothus spp*) may increase in abundance within two to three years following the fire event (Blaisdell 1953, Harniss and Murray 1973, Wright et al 1979, West and Hassan 1985). Juniper reestablishment is typically much slower over the course of several decades.

Bunchgrasses establish themselves primarily through vegetative growth, providing a more uniform response to fire within this growth-form (West and Hassan 1985). The smaller statured bunchgrasses (*Poa* and *Sitanion*) survive fire more easily because of their smaller fuel load which generates less heat to the below-ground component (Wright and Klemmedson 1965). Coarser grasses (*Agropyron spicatum* and *Sitanion hystrix*) generate less heat on combustion and are thereby favored over finer leaved species such as *Festuca*

idahoensis and various *Stipa*'s (Wright 1971). Reports on Idaho fescue vary from low to significant mortality (DeFosse and Robberecht 1996, Hosten 1996).
Pechanec et al. (1954) classifies forbs into three classes of fire susceptibility. As with grasses, fall fires appear to cause the least harm (Wright et al. 1979), though species staying green longer in the summer may be more susceptible to fire (Frischknecht 1978). Recovery, whether by seed or re-sprouting, is dependent on the seasonality of the burn, and moisture distribution following the fire (Wright et al. 1979).

Table AGG-5. Fire-response for Grasses Common to the CSNM

Grass species	Reaction to fire (local observation; Wirka 1999; FEIS database
needlegrasses Achnatherum spp	reported to be the least fire tolerant of perennial bunchgrasses
California brome (*Bromus carinatus*)	top killed; full recovery by following year; recovery similar for spring and fall fire
California oatgrass (Danthonia unispicata)	described as moderately resistant to fire
Tufted hairgrass (*Deschampsia cespitosa*)	root crown survive range of fire intensities; recovers to pre-fire abundance in a few years; also regenerates from seed
Squirreltail (*Elymus elymoides*)	fire tolerant; may increase after fire; fire during summer dormant season best
Blue wildrye (*Elymus glaucus*)	re-sprouts readily from basal buds; positive post-fire seeding response; fire creates favorable seedbed; survive moderate intensity fire
California fescue (*Festuca californica*)	culms and leaves may be killed by fire; re-sprouts from basal buds; may form dense stands following fire
Idaho fescue (*Festuca idahoensis*)	fire sensitive, especially slow moving fires; seeding response following fire; germination enhanced by smoke compounds
Junegrass (*Koeleria macrantha*)	fire resistant grass; no re-sprouting; strong seeding response by fire survivors; re-occupies site through reseeding
one-sided bluegrass (*Poa sekondi*)	small stature and early summer dormancy allows escape from fire; fire kills seeds within top layer of soil; reduced competition enhances re-establishment

Combustion products have been shown to enhance seed germination and/or growth of several Great Basin species that are present or closely allied to local plant species (Blank R.R and Young 1998, Patton et al 1988). These include bluebunch wheatgrass (*Pseudoregneria spicatum*), Thurbers needlegrass (*Achnatherum thurberianum*), Columbia needlegrass (*Stipa columbiana*), needle-and-thread (*Hesperostipa comata*), Sierra Nevada needlegrass (*Achnatherum occidentalis*), Idaho fescue (*Festuca idahoensis*) and antelope bitterbrush (*Purshia tridentata*).

Fire has been shown to increase the species richness of an area by facilitating establishment of native broadleaf (forb) species (DiTomaso et al 1999).

Defoliation treatments (clipping, mowing, grazing)

Stoddart et al. (1975) suggest that defoliation may benefit native bunchgrasses by improving their vigor and seedset response by returning dead foliage to the nutrient cycle, allowing light to penetrate to the live foliage, and by breaking up the duff. Regular long-term defoliation prevents range improvement and may be detrimental to the bunchgrasses, particularly when bunchgrasses are still green (Eckert and Spencer 1987). Forage conditioning treatments (defoliation) may improve the viability of overwintering elk in areas where forage quality is limiting (Clark et. al 1999; Westenskow-Wall et. al 1994).

Re-establishment of native plants

Existing or seeded perennial grasses are usually the best life-form for stabilizing soils following fire. Ideally, revegetation plans for particular projects should be developed several years ahead of time. This would allow for the identification of locally important grasses, the collection of suitable seed, the cultivation of seed in preparation for sowing immediately following disturbance or weed seedbank reduction. This would also follow guidelines for the preservation of genetic diversity.

The varied growth patterns of weeds and limitations on the ability to apply different treatments to the landscape emphasize a need for maintaining the full range of discussed management tools. For the maintenance of native perennial grasslands, Menke (1992) advocates the strategic use of fire and grazing to achieve three important goals. First, to enhance the vigor and longevity of the mature perennial grasses. Second, to break up the decadent grasses and promote vegetative growth. Lastly, to maximize seed production, and thus increase successful sexual reproduction. Menke (1992) emphasizes the active management of ecological processes to maintain existing perennial grass stands to alleviate weed invasion.

<u>Choice of grasses</u>

Where native grasses remain on site, their presence should dictate the composition of the seed species cocktail used for restoration. Field trials on Darrow silty clay loam and Carney clay in Southwest Oregon indicate that Idaho fescue appears to be one of the best native grasses to plant in areas where annual grasses are present because it best emulates annual growth patterns enabling competition with annual grasses once properly established (Borman et al. 1990; Borman et. al 1991). This is supported by the persistence of Idaho fescue in the presence of cheatgrass and intense grazing within sagebrush steppe vegetation of the Great Basin (Goodwin et. al 1999). In addition, this species is long-lived, a fact that might contribute to it's persistence at a particular site (Dremann 1992). Berber Orchard grass was determined to be the best non-native grass species for rehabilitation of annual dominated grasslands (Borman et. al 1991). In general, early growing species are more effective at suppressing annual grass. Research in the great Basin has shown that squirreltail (*Elymus elymoides*) is a potential competitor with medusahead (Jones 1998).

Lack of availability of native seed source may force managers to use exotic plants for revegetation in the belief that providing plant cover will reduce erosion. Using species such as orchardgrass or crested wheatgrass produces artificial plant communities with limited long-term species richness counter to the goals an objectives of ecosystem management (Brown and Amacher 1999). Such monocultures may be susceptible to insect and disease outbreak. Land managers are also discovering that livestock and wildlife may congregate in these artificial conditions at particular times of the year thereby contributing to soil instability (Brown and Amacher 1999).

Seedbed preparation

Options for seedbed preparation are limited in wildland situations where weeds are present. Grazing, mowing, and fire can sometimes be used for weed control, but these are rarely successful, because a minimum of three years of treatment are required to reduce the weed seedbank to acceptable levels. Rocky substrates and the presence of trees usually prevents the use of cultural treatments. Livestock are sometimes used to break up the soil surface, and to provide safe-sites for seeds. However, such treatments (including imprinting, root ploughing, and ripping) resulted in the seeds being buried too deeply for effective germination (Winkel et al. 1991). Smooth soil surfaces favor small seeds, while large seeds are favored by coarse soil surfaces (Von K. and Roundy 1991). Small seeded grasses thus establish better where no seedbed preparation has taken place because of the seed reserves and the energy requirements of seedlings to emerge from the soil. Imprinting of the soil surface (using rollers) has also been found to be successful in other circumstances, as depressions in the soil surface collect moisture, thus aiding plant establishment. Clary (1989) found that imprinted sites had better grass establishment than sites that had been drilled. The success of these mechanical treatments is likely to vary over the landscape and between years.

Brown et al (1999) found that successful native bunchgrass establishment followed an interaction between nutrient status and competition from weeds. Mulch and slow release nitrogen fertilizers were useful for establishing native grasses. The presence of weeds was a strong detractor of perennial grass establishment. Weed-free native straw was particularly favorable for establishing species of the same plants from which the straw was derived. Rice straw was favorable because imported weeds were less likely to be adapted to the restoration site. High nutrient sites are frequently associated with weed invasion. Remnant native grass species may be associated with poor soils.

Timing of Brush Removal and / or Fire

The timing of prescribed fire is very important, since native bunchgrasses are susceptible to die-back if burnt while they are still green. At sites where native grasses can still be found, fall fires are best unless fuel loads dictate an excessively hot fire which would be harmful to the grasses. Where no native grasses persist and annuals dominate the herbaceous layer, spring / summer fires prior to annual grass seed drop are recommended. In all cases, fire should be followed by late fall seeding, using native grass seeds.

The timing of manual treatments could have an effect on native species restoration. In areas where annual grasses are present, spring early summer disturbance may substantiate their presence. These annual species can complete their life-cycle and increase their presence in the seedbank in a short time. Clearing later in the summer, fall, or winter followed by native seed application may alleviate the impact of these weeds. Sites with a heavier cover by native perennial grasses are a better candidate for spring clearing.

Where fire is used to reduce slash, the burn piles could be placed in interspaces already dominated by annual grasses. Burning would thus kill the annual grass seeds in the soil, and free up more space for seeding by native perennial grasses. Indiscriminate placement of burnpiles could further reduce the distribution of native perennials. Burning in the fall would prevent the colonization of the burn spots by annual seed. It is very important that all bare areas be seeded in the late fall! A simple monitoring system could be instituted to gauge whether these management practices are successful.

Prescribed and wildfires may provide an opportunity for seeding if a large component of the vegetation cover has been removed (Agee 1993). Seed should be applied prior to rainfall, to ensure optimal seed burial by ash (Agee 1993, Hull and Holmgren 1964). In areas of mixed grassland and shrubland, re-seeding should be concentrated in areas demarcated by white ash, where excessively high temperatures have probably killed the native seedbank. This allows natural revegetation in adjacent areas (Agee 1993). Heavily forested areas and shrublands may need to be seeded over their entirety. Where fire has not occurred, raking (or other manual/mechanical disturbance) also serves to ensure seed-mineral soil contact, essential for good germination of seeds (Torrel et al. 1961) as well as desired grasses (Goebel et al 1969). This also reduces seed loss due to predation. In drier climates where decomposition processes are slow, litter removal is considered to be an important step in revegetation by perennial grasses (Torrel et al. 1961, Goebel et al 1969). A general recommendation is to sow seed wherever there is not suitable plant cover for holding the soil and litter in place.

Some important soil characteristics affecting plant growth

Hester et. al (1997) report a temporary increase in hydrophobic properties of soil following prescribed fire within oak woodland,-juniper-bunchgrass communities on the Edwards plateau in Texas. This has been observed following local prescribed burns, and may affect soil runoff, the potential for erosion depending on topography, and the short-term ability for soils to absorb moisture.

Shrink-swell clay soils (of which there is a preponderance in the CSNM) create a particularly difficult environment for reestablishing native grasses (Young et. al 1999). The churning action of the soil prevents the establishment of desired native seedlings. The authors tried a range of organic mulches to ameliorate soil conditions in their northeastern California research sites without success. Only the application of 1 to 2 inches of sand created an environment suitable for seedling germination and establishment.

Conclusions

It becomes apparent from the above literature review that weed management requires a careful consideration of individual species ecology (both weeds and existing native vegetation), stage of weed invasion, juggling of control measures (type, timing, and intensity of application), and a reintroduction of native plants to prevent weed re-invasion.

Several authors place an emphasis on preventing weed invasion by careful maintenance of existing healthy plant communities using a range of management tools. The literature indicates that management strategy should be adjusted to match the degree of weed infestation. Monitoring and treatment of new weed infestations is a high priority. Restoration of large areas of weed mono-cultures may not be possible or economically viable.

Strategies of weed containment and reduction must be practiced for successful control of weeds in large areas. Where feasible, weed management within extensive annual populations call for the enhancement of weed seedbank germination followed by harvesting using a variety of control measures (integrated management) targeted at specific weeds. Prescribed fire provides an opportunity for introducing desired native plants into plant communities with small seedbanks of desired native herbaceous plants.

While many weed problems exist on the CSNM, the most pervasive weeds within the grass/shrub/woodlands are annual grasses and yellow starthistle. High annual seed germination makes annual grasses susceptible to seedbank management strategy for reducing weed impact. Yellow starthistle grows rapidly in the mid-summer, thus remaining green when much of the surrounding vegetation has completed its life-cycle or has entered summer dormancy. This makes yellow starthistle more susceptible to control measures preventing seedset while other intermingled species have already completed their life-cycle, or reproduce vegetatively. Roche (1997) suggests that because of the late phenology of yellow starthistle, the maintenance of a plant community capable of depleting soil moisture is the best management strategy available. In existing stands of herbaceous vegetation where the depletion of soil moisture is not possible, the maintenance of winter shading of rosettes becomes the best management strategy.

The literature also describes the extreme difficulty in restoring annual grasslands to native grass dominated communities, particularly on soils with shrink-swell clays. The Agate Flat area of the CSNM provides such a management dilemma. However, past rehabilitation efforts have successfully introduced non-native pubescent and other wheatgrass to provide vegetation structure and forage.

As with all weed species, the choice and timing of management treatments need to be tailored to local conditions and the plant community within which weeds are found. The management strategy described in this document is designed to be flexible and incorporate the literature referenced within this manuscript and new knowledge as it becomes available.

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Appendix HH - Hyatt Lake Recreation Complex Management Plan

INTRODUCTION

Background

Purpose and Scope

This recreation area management plan serves a dual purpose. First, it establishes management direction by prescribing a comprehensive set of compatible actions which will, when implemented, provide the Hyatt Lake Recreation Complex (HLRC) with the overall resource protection, development, and level of public utilization intended by the planning effort participants. Second, this plan sets forth a general sequence for implementing the identified management actions.

Because this is an issue-oriented document, its scope is intentionally limited to a discussion of actions required to resolve issues and take advantage of opportunities provided by the area. Detailed site planning and facility design efforts will be undertaken for the area following approval of the specific management actions identified in this plan.

Relationship to District Planning

The Hyatt Lake Recreation Complex includes 474 acres which were part of the Hyatt Howard Special Recreation Management Area. This area was established to protect the viewshed around Hyatt Lake and Howard Prairie Reservoir. Now this portion of the SRMA is within the Monument and includes the Hyatt Lake Campground and all facilities, the Wildcat Campground, and the Watchable Wildlife Site at Hyatt Lake. The snowmobile trails east of Hyatt Lake are also included within the Monument.

The SRMA designation was the preferred alternative of the Medford District Resource Management Plan (UDSI 1995a). The designation and management as a special recreation management area was therefore, consistent with the District's current land use planning effort. The inclusion of the Hyatt Lake Recreation Complex within the Monument was accomplished by President Clinton in his Proclamation.

Setting and Multiple Resource Values

Location

The Hyatt Lake Recreation Complex is located on the shore of Hyatt Lake on the Dead Indian plateau, approximately 18 miles east of Ashland, Oregon.

Access

The HLRC can be accessed from the Rogue Valley through Ashland by either the Dead Indian Memorial Road or the Greensprings Highway (Hwy 66). From Klamath Falls, the area is reached by taking Highway 140 to the Dead Indian Memorial Road, the Keno Access Road, or the Greensprings Highway.

Other Suppliers of Recreation Opportunities

Two private resorts exist on the shores of Hyatt Lake; these are Camper's Cove and Hyatt Resort. These resorts provide boat launching facilities, camping facilities and food and beverage service.

Importance of the HLRC from a Recreation Standpoint

The HLC serve users from throughout the nation and Canada but most use is regional in nature, from the Rogue Valley, the Klamath Basin, and northern California. The HLRC provides high-elevation lake and forest recreation opportunities year-round and is a major provider of winter recreation opportunities within Jackson County.

Landscape Character

Hyatt Lake is on the Dead Indian Plateau in a valley surrounded by moderate to steep slopes of the western Cascades. Elevations range from 5,026 feet at Hyatt Lake Dam, to over 6,100 feet on surrounding peaks.

Physiography

The Dead Indian Plateau lies in the Cascade Province which forms a steep north-south ridge on the east side of the Bear Creek Valley. This ridge is composed of north-south trending volcanics which form the mountains in this planning area. Soils have formed mainly from andesite and other basic igneous rocks. Textures are dominated by low shrink-swell clays on gentle slopes. Ridges have soils with stony, loam textures.

Annual precipitation ranges from 25 to 45 inches with most of it coming as snow. Winter snow depths vary from 18 inches in a bad year to 10 feet in a great year. Because of the elevation, summer months are usually mild and sunny with afternoon thunderstorm activity common.

Because the HLRC is at high elevation, and far enough from major population centers, air quality is generally excellent.

Existing Recreation Facilities and Designations

Facilities around Hyatt Lake include Hyatt Lake and Wildcat campgrounds, which are managed by BLM. The Hyatt Lake Campground has showers and boat launching facflities, but no hookups. Wildcat Campground is more primitive, with a restroom, tables, and fire pits. A BLM Watchable Wildlife site is located on the west side of Hyatt Lake.

There are two privately operated resorts around Hyatt Lake, Campers Cove and Hyatt Lake Resort. These provide camping with hookups, showers, restaurant facilities, boat launching facilities, and limited groceries. Hyatt Lake Resort also provides gasoline and boat rentals.

Seasons and Times of Use

The HLRC is used year-round by recreationists. Most use occurs during summer with camping and fishing being primary activities. During the fall and early winter, hunting and camping associated with hunting are the primary activities. Winter use is growing faster than any other season. The HLRC is close to the Rogue Valley, the area is at high elevation, and the snow is fairly reliable.

The lack of services, especially gasoline, is a major factor limiting winter use. Should this change, winter use could equal or exceed summer use.

Length of Stay

Length of stay varies by activity and season. People camp as long as 14 days on public lands and there are year-round residents within the area who recreate daily. Conversely, as little as 15 minutes is spent at the Watchable Wildlife site by some users.

Party Size

Party size is as variable as activity preference or length of stay. There have been 200 people in one group at the winter play area and 150 people at family reunion barbecues all the way down to individuals recreating.

Place of Origin

Most use comes from Rogue Valley residents with significant use also coming from northern California and Klamath Basin residents. Although mostly regional in nature, at any given time, the visitors to the HLRC represent a blend of local, regional, statewide, national, and international populations.

MAJOR ISSUES

The management objectives presented can only be achieved by recognizing issues and implementing specific actions to resolve them. Since issue resolution is the key to successful management, a comprehensive issues statement was developed and analyzed during the planning effort. The major issues identified below influenced the development of the management action program presented in Part III.

PART I

Issue I - Future Developments in the Hyatt Lake Campground

Comment
The main Hyatt Lake Campground receives more use every year, and as use patterns and preferences change, changes within the campground are necessary to meet demand and better utilize the facilities.

Issue 2 - Wildcat Campground

Comment
Wildcat Campground was designed as an overflow facility for use when the main campground was full. It is more primitive than the main campground. What improvements, redesign, or restrictions should be planned for this site?

Issue3- Winter Use

Comment
Winter Use is increasing yearly.

Issue 4- Visual Resource Management (VRM)

Comment
What actions will be undertaken to improve the visual resources of the HLRC?

Issue 5- Cooperation between Managing Agencies and Private Corporations.

Comment
The existing good relationship between the various providers of the recreation experience at Hyatt Lake must continue. This will result in the greatest benefit to our "customers."

PART II -- MANAGEMENT OBJECTIVE AND CONSTRAINTS

The HLRC was recognized as an area where a commitment has been made to provide specific recreation activities on a sustained basis in Cascade-Siskiyou National Monument.

To conform with Bureau policy as it relates to planning for special recreation management areas, management objectives should be stated in terms of the Recreation Opportunity Spectrum. Therefore, in keeping with the intent of BLM recreation program planning policy, the following management objective has guided the planning effort.

Management Objective

The HLRC shall be managed to provide recreation opportunities ranging from 'semi-primitive motorized' (SPM) to 'roaded natural' (RN) in a manner that will:

1. Promote public use and enjoyment of the public lands;
2. Protect natural resource values on the public lands;
3. Minimize conflicts among users;
4. Protect the health and safety of recreationists who use the public lands.

Management Constraints

Constraining factors which, because of law, policy, regulation, or circumstance, influenced the development of the management program presented in Part III include:

1.The spotted owl recovery plan;
2.The Endangered Species Act;
3.BOR controls the concessions and surface rights on Hyatt Reservoir;
4.T.I.D. controls the water releases from both Hyatt and Howard Prairie reservoirs;
5.Cooperative agreements exist between BLM and private timber companies for winter trails.

PART III - The Management Plan

The management plan is a composite of separate actions which need implementation to resolve issues and accomplish the management objective. The major issues previously identified and discussed in Part I are listed below along with management actions planned to resolve them.

Issue I - Developments in the Hyatt Lake Campground

Action 1.1. Construct an amphitheater for campfire type programs and presentations.

Discussion There is no facility within the campground where programs can easily be presented. A small amphitheater with approximately 50 seats would meet this need.

Action 1.2 Construct one to three tent cabins with screened porches, in what is now the walk-in tenting area.

Discussion These cabins would be available by reservation or if vacant, they could be rented at the site.

Action 1.3 Purchase a 14' boat, a 25 hp motor and trailer for use on Hyatt Lake.

Discussion A motorboat is needed to move and maintain the fishing piers, to assist with free fishing day, to patrol the shoreline, and to assist in search and rescue.

Issue 2 -- Wildcat Campground

Action 2.1. Drill a well to provide water for the campground.

Discussion There is no drinking water provided at the site now. With increasing use and the development of additional campsite, the provision of water is necessary. This action encompasses drilling, casing, pump, etc. to provide potable water.

Action 2.2 Explore the possibility of developing a trail from the campground to the PCNST.

Discussion The PCNST is a popular equestrian trail and with the addition of horse camp facilities, a trail might be needed to direct users to the PCNST. Now that the horse camp units are built use will be analyzed to determine if a trail is needed.

Issue 3 -- Winter Use

Action 3.1. Maintain and improve trail opportunities for winter use throughout the HLRC

Discussion As desires and equipment change, users are constantly seeking new trail opportunities. BLM will maintain, improve, and develop winter trails on a continuing basis.

Action 3.2. Maintain gates on nine roads, to be locked when snow levels are sufficient for snowmobiling.

Discussion When snow levels are sufficient for winter use but not too deep to prohibit some 4x4 vehicles, severe rutting of trail systems can occur. This ruins trail grooming efforts and also makes trails unsafe because of the ruts. Signs have been used but are ineffective with some less cooperative users.

Action 3.3. Improve ice-skating opportunities within the HLRC.

Discussion Design the main campground play field to allow flooding. During winter months, the field could be flooded using a nearby fire hydrant to create an ice rink. Unlike the lake, there would be no danger of falling through the ice, and conditions would be more controllable. The play field / rink could be plowed by BLM with a small tractor and blade.

Action 3.4. Provide for snowplowing to the watchable wildlife site, the Hyatt Lake administration site, and if possible, the East Hyatt Road from Highway 66 to the Hyatt Lake Campground.

Discussion Roads to the winter play area and the administration site are plowed yearly. The watchable wildlife site is paved and has a restroom so it makes a good location for a winter trailhead. The road from Highway 66 to Hyatt Lake has not been plowed by BLM on a regular basis. As demand for winter use of the HLRC increases, reliable snowplowing of this primary access road might be necessary.

Issue 4 - Visual Resource Management (VRM)

Action 4.1. Discuss powerline maintenance with Pacific Power to lessen visual impacts.

Discussion Pacific Power has been very cooperative in efforts to minimize visual impacts from hazard tree removal where the powerline crosses the East Hyatt Road. Trees were topped rather than removed, leaving a more scenic corridor.

Action 4.2. Plant hardwood trees and shrubs that produce fall colors.

Discussion Driving for pleasure is the number one recreational activity of Americans, and areas with bright fall foliage are extremely popular. By planting maples, oaks, aspen, etc., along the main roads and recreation sites, fall color will be added to the views.

Issue 5 - Cooperation between Managing Agencies and Private Corporations

Action 5.1 Contact the U.S. Bureau of Reclamation (BOR) regarding surface management of Hyatt Lake.

Discussion The BOR controls the surface activities on both Hyatt Lake and Howard Prairie reservoirs as well as the Hyatt Lake Resort concession. Discussions have been ongoing concerning transferring surface management of Hyatt Lake to BLM. This matter needs to be resolved.

Action 5.2. Maintain a level of cooperation that exists between BLM and Hyatt Lake Resort and Camper's Cove Resort.

Discussion A good relationship existing between resort operators and BLM benefits all who provide or use the recreational facilities within the HLRC.

Issue 6 - Area Monitoring, Use Supervision, and Administration

Action 6.1. Increase monitoring and supervision duties of seasonal BLM personnel within the HLRC

Discussion With this new Monument designation comes the added workload of patrolling and maintenance. This will be particularly important during hunting season when cross country travel is common.

Appendix II - Questions and Answers from Meeting with Jackson County Commissioner

1. Are the Cascade-Siskiyou National Monument (CSNM) boundaries open for discussion? The way the monument boundary is drawn gives the impression that all CSNM lands are open to the public. How can the BLM contend that private lands shown inside the CSNM boundary are not part of the monument? Can the boundary be drawn around just the federal lands to clarify that only federal lands are in the monument? If the government acquires additional property inside the boundary, will it impact private land owners?

The Cascade-Siskiyou National Monument designation applies only to federally managed land. The external boundary depicted on the CSNM proclamation map is for planning purposes only. All federal lands within this planning area have become the CSNM by presidential proclamation, a designation which can only be changed by an act of Congress. The BLM does not have the authority to modify the Proclamation so the boundaries are not open for discussion.

Privately owned property within the planning boundary is not encumbered by, or in any way part of the CSNM designation. Approximately 38% of the land within the CSNM planning area is private property, owned by various individuals and companies. Again, the CSNM designation does not include, involve, restrict, encumber or have bearing on privately owned (non-federal) property. Privately owned parcels, by definition, are not, and cannot be part of, or within the CSNM. The CSNM policies, rules and regulation do not apply to private property.

The CSNM proclamation permits acquisition of private property within the planning area to further protect the objects for which the CSNM was designated. However, acquisitions would occur with voluntary participants only, and be conducted in accordance with existing laws and regulations pertaining to federal land exchanges and acquisition of non-federal property. In the event additional property is acquired, it will become part of the CSNM and managed in accordance with the monument plan to further the values for which it was acquired.

2. The CSNM proclamation states, "The Federal land and interests in land reserved consist of approximately 52,000 acres..." The boundary on the accompanying Cascade-Siskiyou National Monument map encloses an area of approximately 92,000 acres, of which there are 40,000 acres privately-owned. The numbers are different in other places. There seem to be inconsistencies between the CSNM proclamation wording and maps.

The 92,000 acres identified in the CSEEA scoping letter included the total landscape area that was analyzed (i.e. wildlife habitat connectivity, vegetation typing, transportation system) in the CSEEA/DEIS and included lands in Oregon and California. The CSNM proclamation did not include lands in California. Also, the land designated CSNM within Oregon differs from the area identified in the CSEEA/DEIS. A total of 52,951 acres of federal land were designated as the CSNM.

3. How will the CSNM designation influence the valuation of adjacent private land?

The effect on values of private land adjacent to, or among CSNM parcels is unknown. The director of the Southern Oregon Regional Services Institute at Southern Oregon University and noted regional economist, Rebecca Reid, was previously consulted on this issue. She wrote, "it is plausible to argue that private land values may either increase or decrease. Land values may increase in cases where contiguous public lands remain undeveloped and ecologically improved, and are therefore perceived as special and unique as well. On the other hand, restrictions in uses of contiguous properties that implicitly added value to the private lands may lead to a decline in the private land values."

4. What will be the likely effect of the CSNM designation on the county tax base?

If no additional land is added to the CSNM there will be no impact to the tax base. If private land is acquired, there will be some effect, however the degree would depend on the amount and type of land involved. If the acquired lands are unimproved, woodland, forest or grazing lands, the impact would be minimal because the assessed values per acre are relatively low. For example, in the unlikely scenario every single undeveloped/unimproved parcel within the CSNM was acquired, we calculated from records provided by the Jackson County tax assessor (September, 2000), that the taxes forgone to Jackson County for tax year 1999-2000 would be approximately $25,000.

5. The CSNM Proclamation states "should grazing permits or leases be relinquished by existing holders, the Secretary shall not reallocate the forage available under such ..." What specifically does "relinquish" mean?

If deleterious impacts by livestock are identified within the CSNM, grazing privileges and livestock management will be modified, reduced or eliminated. If livestock grazing is modified, reduced, eliminated or voluntarily relinquished by a permittee, the resultant available vegetation/forage (AUMs) will be reapportioned to benefit natural ecological processes (deer and elk forage, wildlife habitats etc.). A relinquishment is voluntary, referring to when a permittee chooses to reduces or "give up" AUMs. Only the permit holder can initiate a relinquishment. However, the Agency has the imperative to modify, reduce or eliminate livestock grazing where found incompatible with the objects (as described in #14) for which the CSNM was designated.

6. If someone sells their property would their grazing permit be relinquished?

In order for grazing privileges to be transferred, the recipient must qualify under regulation (43 CFR 4110). Contingent upon qualification, grazing permits would be transferred unless voluntarily relinquished. (see #5)

7. How does the CSNM designation affect O&C lands? Does the CSNM proclamation override the O&C Act?

The CSNM proclamation states "nothing in this proclamation shall be deemed to revoke any existing withdraw, reservation or appropriation; however the national monument is the dominate reservation." Further, "the Secretary of the Interior shall manage the monument through the Bureau of Land Management, pursuant to applicable legal authorities including, where applicable, the (O&C) Act of August 28, 1937, as amended (43U.S.C. 1181a-1181j) to implement the purposes of this proclamation." The CSNM proclamation does not change the O&C status of the land, it simply withdraws it from all forms of entry or disposal under the mining, land and mineral leasing laws and removes the timber volume within the CSNM from the Medford Distric's sustainable harvest level calculations (Allowable Sale Quantity). The O&C lands within CSNM remain O&C.

8. What is the status of the commercial size timber within the CSNM? Also, how will dead/hazard tree problems be addressed ? Can these trees be felled?

The harvesting of timber or other vegetative material within the CSNM for commercial purposes is prohibited except when part of an authorized science-based project or for public safety. In addition, the Proclamation removes all timber volume within the CSNM from the Medford District's sustainable harvest level calculations (Allowable Sale Quantity). However, the felling and sale of trees, for non-commercial purposes, where select trees endanger facilities, visitors or public safety may be authorized. Such situations are anticipated along roads, utility right-of-ways, trails, property lines, parking areas, campgrounds and high visitor use areas within the Hyatt-Howard Special Recreation Management Area (SRMA).

9. How does the BLM define "existing roads?"

The term "existing roads" pertains to roads on federal land whose origin, construction and/or use has been authorized. Unauthorized existing vehicle use over an area which has the appearance of a road is termed trespass and not recognized as an existing road. Existing roads were identified and inventoried for the preparations of the CSEEA/Plan. In the CSNM all existing roads will become "designated", then analyzed and categorized. A designated road is "a linear transportation facility on which state-licensed, four wheeled vehicles can travel." By definition, trails are not roads. When pertaining to access, the transportation plan for the CSNM will refer to designated roads in these categories:

- designated for public access all year long
- designated for seasonal public access
- designated for administrative access only
- designated closed
- designated for decommissioning

Roads will be designated in the CSNM plan based on their transportation management objectives, which take into account the need for access, resource protection, type of right-of-way and reciprocal agreements with other property owners. There is no intent to block access to private land. CSNM maps provided to the general public will only show open CSNM roads and those having exclusive easements with public rights.

10. Explain "interest in" as stated in the sentence, "Lands and interest in lands within the monument not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States."

The phrase "interest in lands" refers to lands where the U.S. holds less than fee title. "Interest in lands," refers to a reserved interest such as minerals or timber. It could also refer to an acquired interest such as a scenic easement. In the CSNM proclamation "interest in lands" applies to reserved minerals. There are no reserved minerals in the CSNM.

11. Does the phrase "all forms of entry" include vehicle access?

The Glossary of Public Land Terms defines entry as "an allowed application which was submitted by an applicant who will acquire title to the land by payment of cash or its equivalent and/or by entering upon and improving the lands." Specifically, "entry" was used in the settlement Acts such as homesteading which were eventually repealed by FLPMA. The only form of "entry" now recognized is under the 1872 mining law. The term "entry" as used in the Proclamation does not refer to vehicle access to into the CSNM.

12. What does the phrase "quantity of water sufficient to ..." in the Proclamation mean?

The CSNM Proclamation does not interfere with valid existing water rights. The statement in the CSNM Proclamation, "There is hereby reserved, as of the date of this proclamation and subject to valid existing rights, a quantity of water sufficient to fulfill the purposes for which this monument is established," stipulates that the CSNM has a federally reserved water right with a priority date of June 9, 2000 for an amount of water that is necessary to support the aquatic and terrestrial species identified in the CSNM proclamation (i.e. fresh water snails, three endemic fish species, important populations of small mammals, reptile and amphibian species, and ungulates). The sufficiency of the amount of water reserved will be determined in the future by the BLM and based on the requirements of the species involved. Federally reserved water rights include both springs and in-stream flows.

13. The CSNM Proclamation mentions the Applegate Trail, but it was not included in the Draft CSEEA plan.

The CSNM Proclamation does not mention the Applegate trail, however it addresses the Oregon/California trail and it's significance as an historic site. At the time the CSEEA plan was prepared, there was only anecdotal information as to the exact location of the Applegate trail. Although accurate information is still lacking, any known portions of the Applegate Trail that cross federal land will be addressed in the CSNM management plan.

14. Southern Oregon Timber Industry Association (SOTIA) believes it is important for the Draft Resource Management Plan/DEIS to specify the "objects to be protected" so that they can evaluate the Plan and its sufficiency to accomplish the task at hand.

The CSNM proclamation describes the many objects to be protected. These include:

• Biological Diversity and Richness
This refers to the abundance and richness of all endemic and native species of plants and animals and the diversity of habitats necessary to protect and sustain them. Specifically mentioned are small mammals, reptiles, amphibians, ungulates and butterflies.

• Rare Species of Plants and Animals
Many rare species of both plants and animals, deserving of special attention, have been identified within the CSNM (see DRMP/DEIS). Although not inclusive, the CSNM Proclamation provides examples including, Green's Mariposa lily, Gentner's fritillary and Bellinger's meadowfoam.

• Ecological Integrity
Ecological integrity refers to the extent of habitat disturbance, intrusion, fragmentation or continuity. The maintenance and recovery of many rare and sensitive wildlife and plant populations such as the black tailed deer, Northern Spotted Owl and native perennial grasses depend on the recovery and continued ecological integrity of their habitats.

• Special Plant Communities
Several special assemblages of plant communities exist in the CSNM. The examples specifically mentioned in the CSNM proclamation are the rosaceous chaprarral, oak-juniper woodlands, and juniper scabland communities.

• Aquatic Species and Habitats
Aquatic species and habitats include fresh water snail species diversity, which are found in the many isolated springs and seeps, wet meadows and riparian areas. They also include endemic fish species such as the redband trout, the Jenny Creek sucker and the

speckled dace. Throughout the Monument, important riparian habitats support broadleaf deciduous trees and shrubs.

• **Old-Growth Habitats**
Of particular importance are old-growth forests and the unique habitats that they provide. Many old-growth related or dependent species have been identified within the CSNM including Northern Spotted Owl, Flammulated Owl, western bluebird, pileated woodpecker, and the pygmy nuthatch.

• **Historic and Cultural Structures and Sites (Oregon-California trail)**
Historic and cultural sites and structures are objects of the monument requiring special protection and management.

• **Unique Geology**
Areas of unique geology include Pilot Rock, the Miocene epoch fossil beds, Cathedral Cliffs and the area rich in agate gemstones, Agate Flat.

15. How does the road closure required by the CSNM proclamation affect the Americans with Disabilities Act requirements?

The Americans with Disabilities Act requirements do not pertain to road closures. They are only relevant to facilities and infrastructures such as bridges, restrooms and walkways. Recreational activities in primitive and/or undeveloped areas are not included.